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Maternal perception and fear on the adverse effects of immunization, Surabaya City

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ABSTRACT

The achievement of immunization has become a global focus, not only in Indonesia. Maternal perception is one of the factors in increasing complete basic immunization (IDL) status in an area. The aimed to analyze several perceptions and fear of the adverse effects of mothers with IDL status in non-universal child immunization (UCI) urban village areas in Surabaya City. A cross-sectional study was conducted from September 2019 to May 2020. The sample was the community taken from the baseline data survey on IDL problems in non-UCI villages in Surabaya City in 2017. The five variables are the mother's characteristics, the mother's fear of the adverse effects of immunization, the belief/culture, the mother's busyness, and the family support that can be changed in maternal perception. The Chi-square test and a logistic regression test were both used in the multivariate analysis. And 1,449 mothers were included. The mother's perception that has the most influence is the mother's fear of the adverse effects of immunization with an OR of 10.139 at 95% CI (4.063–25.302). The findings show that they need to get an education or socialization from health professionals, collaborate with religious community leaders, as well as getting health campaigns.

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1. INTRODUCTION

Cases of diseases that can be prevented by immunization (PD3I) continue to increase and are still a global and national health problem with varying incidence rates yearly. One of the most affordable child survival interventions in developing nations is universal immunization coverage [1]. Every year, vaccination effectively prevents nearly 3 million child fatalities [2]. Immunization should be acknowledged as a fundamental element of the right to health and as a responsibility of the individual, the community, and the government [3]. Since 2010, the percentage of people who have received the third dose of the diphtheria, tetanus, and pertussis vaccine has not gone above 86% [4]. More than 19 million kids miss out on the advantages of full immunization each year, and many kids don't get any shots at all [5]. In 2012, the global vaccine action plan 2011-2020 (GVAP) was endorsed by the World Health Assembly. The plan urges all nations to attain a 90% coverage rate for all vaccines included in their national immunization schedules by 2022 [6].

The coverage of complete basic immunization (IDL) in Indonesia in 2021 is nationally 84.2%. This figure has not met the 2021 Strategic Plan target, which is 93.6%, and the coverage rate for UCI in Indonesia is 58.4%. This coverage slightly decreased compared to the previous year's coverage, 59.2% [7]. In the same year, East Java Province achieved an immunization performance of 84.90%, slightly decreased compared to

2020, where immunization coverage was 99.34%. There are 11 regencies/cities with less than 90% coverage. The city of Surabaya, in 2020, achieved a UCI urban village coverage of 98.70%, which has slightly decreased compared to 2019, which reached a UCI urban village coverage of 100% [8]. Villages and sub-districts with complete child immunization are indicated by the universal child immunization (UCI) indicator. The circumstance demonstrated that cases of diseases that could be PD3I are brought on by Indonesia's uneven coverage of IDL and UCI.

Immunization coverage is a multi-sectorial activity [9]. A dedicated focus is required to achieve elimination and eradication [10]. If children do not receive their IDL, diseases that can be prevented through vaccination, including tuberculosis, diphtheria, pertussis, tetanus, polio, and measles-rubella, can spread. A contributing factor to the low coverage of UCI in urban villages is the insufficient understanding of mothers, which can reduce mothers' confidence in the benefits of the immunization program.

Adverse events following immunization (AEFI) is a term that refers to any unfavorable clinical occurrence that follows the administration of a vaccine but does not necessarily have a causal link to it [11]. The most frequently reported fever, swelling at the injection site, were considered AEFI. The most frequently cited vaccines for AEFI were those for measles and the DPT/Pentavalent vaccine [12]. Some parents still feel worried and afraid because of this reaction. In this case, mother's perception has an important role to support increasing coverage of both IDL and UCI. This study aimed to analyze maternal perception and fear of the adverse effects of immunization with IDL status in non-UCI villages in Surabaya City. These findings are important for improving UCI coverage in current and future non-UCI areas. In addition, of course, Immunization provides crucial health benefits and protection against immunization-preventable infections for both mothers and their children.

2. METHOD

This cross-sectional observational analytic study was collected on primary data from the society population from the baseline survey of IDL problem data. The population is children under two years old (12-23 months) in non-UCI urban villages in Surabaya City. The study sample was 1,456 respondents, but seven missed data and were excluded, so a total of 1,449 respondents. The participants were selected from a total sampling from September 2019 until May 2020 after obtaining permission from the ethical research committee from the Health Research Ethics Committee of the Faculty of Public Health at Universitas Airlangga. This study has five independent variables: the mother's fear of the adverse effects of immunization, beliefs/culture, the mother's busyness, the child's health condition, and family support. The dependent variable is the IDL status of infants in children aged 12-23 months in non-UCI urban areas in Surabaya in 2017. The study data were collected through secondary data. The data were analyzed in SPSS using univariate, bivariate, and multivariate regression logistic analysis with the backward method (wald). $p<0.05$ was considered statistically significant.

3. RESULTS AND DISCUSSION

The characteristic description of the respondents can be seen in Table 1. The table shows the characteristics and perceptions of 1,449 mothers grouped based on IDL status and percentage. It shows that most of the variables based on IDL, complete and incomplete, were in the length of stay 0-to-10-year category (48.2%) with 404 mothers with children who have not completed the IDL. Mother's immunization card ownership type was maternal and child book (*Buku Kesehatan Ibu dan Anak* (KIA book)) (78.9%), with 647 mothers who use the KIA book with children who have not completed the IDL. The characteristic of sex *baduta* (under two years old) was men (50.1%), and there is no significant difference between female and male gender based on IDL status. Mothers with family support (96.2%) were more likely to complete their child's basic immunization status than mothers who experienced barriers from family support (3.5%). The majority of mothers o respondents are not fear the adverse effects of immunization (94.4%), have appropriate belief/culture (98.8%), and are not busy (94.3%).

Based on Table 2, the results of the Chi-square test, 4 variables are significantly associated with IDL status, namely mother’s fear of the adverse effects of immunization, belief/culture, mother’s busyness, and family support. These 4 variables have a significant value less than the p-value <0.25, so these 4 variables can be included in the multivariate test (logistic regression). Multiple logistic regression analysis was conducted to determine the most influential variables on IDL status. In multiple logistic regression analysis in the second stage, the variable of family support was excluded from logistic regression modeling because it had a significant value >0.05, which was 0.246 means that the family support variable has no influence on IDL status. So, the final results of the multiple logistic regression test are shown in Table 3.

Table 1. Frequency distribution of participants variabel data

Variables	IDL status				Total	
	No		Yes			
	n	%	n	%	N	%
Mother's characteristic						
length of stay of the mother (year)						
0-10	404	27.9	295	20.4	699	48.2
11-20	144	9.9	85	5.9	229	15.8
21-30	212	14.6	139	9.6	351	24.2
31-40	94	6.5	67	4.6	161	11.1
41-50	5	0.3	3	0.2	8	0.6
51-60	1	0.1	0	0	1	0.1
Mother's immunization card ownership type						
No card	34	2.3	3	0.2	37	2.6
KIA's book	647	44.7	496	34.2	1143	78.9
KMS's book	100	6.9	45	3.1	145	10
Another card	79	5.5	45	3.1	124	8.6
Baduta's characteristic						
Characteristic of sex *baduta*						
Male	429	29.6	297	20.5	726	50.1
Female	431	29.7	292	20.2	723	49.9
Mother's fear of adverse events immunization						
Fear	76	5.2	5	0.3	81	5.6
Not fear	784	54.1	584	40.3	1368	94.4
Maternal perception						
Belief/culture						
Appropriate	843	58.2	588	40.6	1431	98.8
Inappropriate	17	1.2	1	0.1	18	1.2
Mother's busyness						
Busy	61	4.2	22	1.5	83	5.7
Unbusy	799	55.1	567	39.1	1366	94.3
Family support						
Supported	810	55.9	584	40.3	1394	96.2
Not supported	50	3.5	5	0.3	55	3.8

Table 2. Chi-square test

Variables	Chi-square	p-value
Mother's fear of the adverse effects of immunization	40.769	<0.001
Belief/culture	7.889	0.005
Mother's busyness	6.691	0.010
Family support	22.260	<0.001

Table 3. Multiple regression for predicting several barriers from the perception mother

Variables	B	Wald	Sig.	Exp (B) (OR)	95% CI	
					Lower	Upper
Fear's mother of adverse events immunization	2.316	24.647	<0.001	10.139	4.063	25.302
Belief/culture	2.250	4.647	0.031	9.487	1.234	72.932
Mother's busyness	0.534	4.160	0.041	1.705	1.021	2.849

In this study's multiple logistic regression analysis, the Hosmer and Lemeshow Test results were obtained with a significant value of 0.444, which means that the model formed is strong, fit, or good. This finding revealed the influence of mothers' perceptions about mothers' beliefs, mothers' busyness, and fears regarding the adverse effects of immunization on IDL. Meanwhile, mothers who had no fear of the adverse effects of immunization had 10.139 times the possibility of completing their child's IDL status. Incomplete vaccine coverage may be influenced by factors related to belief and culture, including concerns about potential adverse effects of vaccines and lack of trust in vaccine efficacy [13] from mothers. There were 9.487 at 95% CI (1.234–72.932) times to the possibility of completing their child's IDL status.

3.1. Discussion

Immunization plays a crucial role in promoting children's health in both urban and rural settings [14] it is considered as an effective measure in preventing the transmission of diseases, particularly among children [15]. Surabaya is one of the big cities in Indonesia. Many factors can influence mothers' perceptions of completing their child's immunization. Specifically, the results show that some mothers still have a negative perception of IDL with fear of adverse effects of immunization in correlation to IDL status. A

negative maternal perception often interpreted as a method of preventing immunization-preventable diseases, which add other diseases to children. A few respondents fear that vaccines are not beneficial in disease prevention (13.6%) and that vaccines harm (13.3%) [16]. In another study, about 24% believed that natural immunity is strong, although it is not enough to prevent children from diseases, so immunization would not be necessary. In addition, 50.9% disagreed that vaccines during immunization weaken natural immunity in children, and 39.6% disagreed that immunization leads to other diseases not treatable with vaccines [17].

Therefore, a good mother's knowledge is needed to complete the child's basic immunization. Good or adequate knowledge will create a good understanding so that the mother with a baby or toddler is fully aware to immunize her baby [18]. Increased knowledge enhances the chances of complete immunization of children [19]. Therefore, it is necessary for medical professionals to provide mothers with guidance because immunization during prenatal care or after delivery is likely to keep their children's current immunization status [20]. On the other hand, a study by Tesema *et al*. [21] report that maternal and paternal education were significant predictors of complete basic childhood vaccination. One of the factors is family support for the complete immunization of children. Although this study did not show the effect of family support variables, this finding is distinct from other studies that have demonstrated that mothers who receive substantial family support are 2.29 times more likely to ensure their infants receive IDL compared to mothers who receive limited family support [22].

Another reason for mothers not immunizing their children is the busyness of mothers who do not have time to bring their children to immunizations at health services and wait for the rolls [23]. This study showed that 1.705 at 95% CI (1.021–2.849) mothers who are not busy have a 10.139 times higher possibility of completing IDL of their infant. Similarly, in other studies, work or busyness is not associated with IDL status [24]. On the other hand, Najikhah *et al*. [25] report that compared to parents who don't work, parents who are farmers or laborers are 1.05 times more likely, self-employed people are 1.24 times more likely, and people who work for the government, the military, or private companies are 1.90 times more likely.

Health development, which aims to increase awareness, willingness, and application of a healthy lifestyle for the community, is one way to improve health status [26]. Therefore, educating mothers who are immunizing their children during immunization campaigns is crucial (83.80%), as is immunizing children against seasonal illnesses (82.90%) [27]. Thus, we need health professionals who have an important role in the completeness of basic immunization because health professionals provide comprehensive information about postpartum [28]. In Indonesia, usually, nurses or midwives hold the role of educating the community. Midwives can improve good perception by motivating mothers to be obedient to complete their children's immunizations [29].

When it comes to determining their children's vaccination status, mothers play a significant role. Vaccinations provide protection against common preventable diseases [30]. Moreover, to increase mothers' perceptions and eliminate the fear of the side effects of immunization, the Indonesian government, especially the City of Surabaya, can take various ways. One is innovating the implementation socialization of IDL to increase mothers' awareness to pay more attention to schedules and immediately immunize their babies at the nearest health service. Providing accurate information and increasing knowledge about maternal immunization, particularly from trustworthy sources, may alleviate most of the existing concerns and misunderstandings about immunization. This, in turn, has the potential to improve maternal immunization uptake [31]. The Indonesian government has initiated public health campaigns to expedite the process of obtaining halal certification for newly developed vaccines. Additionally, the Indonesian Ulama Council has issued a fatwa declaring that the measles-rubella vaccine is permissible for use, despite containing a pig derivative. These initiatives seek to broaden the scope of child immunization coverage [14] because there are still many mothers in Indonesia who have the understanding that vaccines are not halal. However, to maintain coverage, it is required the need for more intensive routine immunization activities [32]. It is necessary to investigate methods for better access to mothers, for instance, during routine pediatrician or family doctor visits [33].

There are adverse reactions after given basic immunization, Shukla and Shah [34] finds uncommon adverse effects of the Bacillus Calmette-Guerin (BCG) vaccine may include ipsilateral axillary/cervical lymphadenopathy, abscess formation, and disseminated BCG infection. The unfavorable effect of oral polio vaccine (OPV) is when the vaccine viruses infect the intestines and trigger an immune response; IPV's adverse reaction is secure, but sensitive people may experience allergic reactions to streptomycin; The negative impact of DTPw is Among the frequently occurring side effects are fever, localized pain, and redness; Typhoid, Hb-Hib conjugate, and Measles and mild localized pain and swelling are adverse reactions to vaccinations; and the adverse reaction to the rubella vaccine can occasionally include fever and a macular rash 7–10 days after the shot. Given that vaccines, like other drugs, are not 100% effective or safe, there has been no compensation for serious adverse events. However, they are rarely found to be causally related after immunization [35]. Generally, vaccination has been well tolerated in most populations and has benefits that outweigh the risk of side effects in most vaccine recipients [36]. As a result, mothers who have reservations

about immunizing their kids risk spreading infectious diseases to the area. Every nation ought to have an effective and reliable vaccine pharmacovigilance system that can identify, evaluate, comprehend, and communicate any AEFI and other vaccine- or immunization-related problems [37].

Our study has some limitations, that the results of multiple logistic regression show a Nagelkerke R Square value of 6.7%, which means that the research variable is only able to explain the dependent variable of 6.7%. This is because many factors influence IDL status in non-UCI sub-districts in Surabaya City, which cannot all be examined in this study. For future research, research using health workers and cadres at the Public Health Center and Integrated Services Post (*Posyandu*) as research respondents to see the relationship between the role of facilities and health workers on IDL status in non-UCI urban areas of Surabaya City. As the nation gets ready to move away from outside assistance and mobilize more domestic resources for routine immunization, it is essential for planning and advocacy. To support the translation of the study's findings for use in policy decisions, planning, and budgeting, additional work is needed [38].

4. CONCLUSION

The study found that the perception of mothers with IDL has the most influence, namely the mother's fear of adverse effects in the body after immunization. In addition, other variables such as beliefs/culture and mother's busyness also affect the status of IDL. Therefore, Increasing the ability of officers in building good communication and motivating mothers is needed to maintain a good perception in society. As much as it matters, that officers have to provide education and counseling actively with updated methods related to IDL in the nearest *Posyandu*. It is essential to build the trusted of mother with officers.

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